DRAFT Attachment 7-WRD 10.06

Hazard Analysis Guidelines for Risk Factors 13-14, Hand-Arm Vibration

Department of Labor and Industries
WISHA Services Division

This document will assist inspectors in reviewing work sites where caution zone jobs have been identified. The inspector does not have to evaluate every job, but can use the following strategy for representative sampling. Inspectors will use Appendix B of the rule (WAC 296-62-05174) to evaluate whether there are hazard zone jobs. However, the employer has the option to use an analysis tool other than Appendix B. Some acceptable methods of alternate analysis are identified with each risk factor; in cases where the employer is relying upon either a listed alternative or another alternative, the inspector will need to request that an ergonomist assist them in these inspections.

This attachment contains the following sections to assist inspectors in making their determinations:

- Typical clues to recognize Hand-Arm Vibration
- Typical jobs where hazard zone risk factors for Hand-Arm Vibration are found.
- Tips on measuring Hand-Arm Vibration
- Examples of acceptable methods of hazard analysis when using the general approach
- Typical controls chart
- Common questions for Hand-Arm Vibration

The caution zone criteria for Hand-Arm Vibration are:

- Using impact wrenches, carpet strippers, chain saws, percussive tools (jack hammers, scalers, riveting or chipping hammers) or other hand tools that typically have high vibration levels for more than 30 minutes total per day
- Using grinders, sanders, jig saws or other hand tools that typically have moderate vibration levels for more than 2 hours total per day
- NOT COVERED: hand tools vibrating less than 2.5 meters per second squared (m/s^2) eight-hour equivalent

The hazard zone risk factors for Hand-Arm Vibration per Appendix B (WAC 296-62-05174) are:

- Identify the vibration value and the time in hours the tool is used, then use the hand-arm vibration tool in Appendix B (WAC 296-62-05174) to determine the hazard level.

Typical clues to recognize the risk factor: Hand-Arm Vibration

- Workers holding/operating power tools in their hands for a large part of the work day
- Workers that complain of tired hands from vibrating tools, or who visibly "shake out their hands" periodically when using vibrating tools
- Loud, rough noise generated by tools that cut, saw, grind, materials
- High vibration tools - used for short periods of time (or more)
- Medium vibration tools - used for long periods of time

Typical jobs where Hand-Arm Vibration risk factors are found:

(Note: Assigned high-medium-low levels of vibration for the hand tools listed below are approximations, intended as a rough guide only. The actual vibration levels must be identified for each tool.)

Risk Factor	Typical Jobs and Tools
Moderate-High Hand-Arm Vibration (hand-held tools) (these tools typically have high vibration levels)	• Percussive tools (jack hammers, scalers, riveting hammers, chipping hammers) • Chain saws • Impact wrenches • Vibrating knife • Metal finishing (auto body, aerospace, riveters) • Carpet strippers (hand-held)
Moderate Hand-Arm Vibration (hand-held tools) (these tools typically have moderate vibration levels)	• Grinders/sanders • Power saws (jig saw, sabre saw) • Power saws (circular saws) • Power drills • Power screw drivers • Nut runners • Hedge clippers • String trimmers • Brush cutters (hand-held)
Low-Moderate Hand-Arm Vibration (hand-held tools) (these tools typically have lower vibration levels, but may be significant, especially when used for longer periods of time	• None listed

Not covered *	
(hand-guided devices) (Note: Whole body vibration is NOT covered by the Ergonomics Rule)	• Power lawnmowers • Riding lawn mowers • Trenching tools (e.g., ditch witches) • Brush cutters (walk behind) • Floor sanders and buffers • Power floats, concrete finishers • Vibrating (plate) compactors • Vehicles – cars, trucks, buses, etc. • Vehicles – forklifts • Heavy machinery – milling machines • Folder/puncher • Table saws, radial arm saws, band saws • Carpet strippers (walk behind)

Tips on measuring the risk factor Hand-Arm Vibration:

- Check any available L&I, or L&I-referenced, widely available on-line tool vibration databases to see if the tool is listed. (see http://www.lni.wa.gov/wisha/ergo)

- If the tool is not listed on the L&I, or L&I-referenced vibration databases, check with the manufacturer to see if a vibration value (meters per second squared: m/s^2) is available for the specific tool.
(The employer may possibly have tool literature containing this information)

- Caution: If the vibration level is not available for a tool, don't assume it's the same level as a similar tool from the same, or a different, manufacturer. Vibration levels vary widely, due to different manufacturers and different tool models within the same manufacturer. Looking at a range of similar tools may be useful in identifying the approximate range of vibration levels for similar tools (for technical advice only).

- Determine the total time of exposure to the vibration (actual time of tool use, or extrapolated from the percentage of a task cycle that the tool is used, etc.). Time spent carrying the tool around when it's not on doesn't count towards the total vibration exposure time.

Examples of acceptable methods of hazard analysis for Hand-Arm Vibration (acknowledged by the general performance approach within the rule):

- ANSI S3.34-1986 (R1997) Hand Arm Vibration Standards

It is acceptable for an employer to have used this method to assess high hand force for the job in question. There may also be other assessment methods not listed here that would be acceptable. Inspectors-consultants will need to ask for the results of the assessments. Contact the ergonomists at Policy & Technical Services for assistance. Inspectors do not need to know how to do these assessments nor how to interpret them.

Typical Controls Chart for Hand-Arm Vibration:

Risk Factor	Typical Control
Moderate-High Hand-Arm Vibration (hand-held tools)	• Select power tools with lower vibration levels • Provide regular maintenance to minimize tool vibration • Isolate vibration between machine and hand • Reduce exposure duration • Use anti-vibration gloves (should be full-fingered, meet ISO 10819 standards, and even then are only 10-15% effective in reducing vibration)

Commonly asked questions for Hand-Arm Vibration:

(1) What if the employer has a tool with an unknown vibration level?

If L&I cannot confirm that a vibration tool exceeds regulatory levels based on data available to the employer then it will be assumed that the tool does not exceed the vibration levels in the rule and therefore no violation has occurred. If the information is readily available and the employer did not make a reasonable effort to try and find that information, this could be considered a violation of the caution zone/hazard assessment obligation. If the employer looked in reasonable locations for the information and did not find it, then it is not a violation even if Labor & Industries is able to locate the information and demonstrate that the tool in fact exceeds values in the rule. However, the employer should then be advised in a message of the requirement to control the vibration level or otherwise deal with the hazard if in fact the vibration level falls within the hazard area. If a tool's vibration only falls into the caution zone area, then the employer only has to provide the necessary awareness education.

(2) Can an inspector determine Ergo Rule vibration compliance for an unknown vibration tool by comparing it with a "similar" tool?

No. Comparing an unknown tool's vibration level with another similar tool from the same manufacturer for which the value is available is not correct. Comparing similar looking models of a manufacturer's tool, or comparing an older tool with a newer tool's catalog vibration value is also not correct. The internal components (even for the same manufacturer) may be very different for similar looking tools. If vibration data for an employer's specific tool is not available, then nothing can be done to determine Ergo Rule vibration compliance. In other words, the employer won't know if the tool is in compliance but neither will L&I, so no citation will be issued. L&I will also be using the manufacturer's data for the vibration determination. L&I will not request vibration data specific to that site.

(3) Does the rule apply to all vibration tools/equipment?

Hand guided devices are exempt from the ergonomics rule. These devices (e.g., power lawnmowers, trenching tools, floor sanders and buffers, and power trowels) do produce vibration, but are not considered “hand tools” as described in the rule. Recognizing that the vibration produced by these devices can pose a similar health hazard to hand tool use, Labor and Industries will work with industries that use vibration-producing hand guided devices to identify lower vibration alternatives or other controls on a voluntary, consultative basis.

Sources of whole body vibration are not covered by the ergonomics rule. Examples of other exempt equipment/vehicles include riding lawnmowers, forklifts, heavy machinery, cars, buses or trucks.